



# Bibliometric Analysis of Online Learning in the Era of Technological Progress

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## Abstract

In the era of technological advances, much learning has been shifted to online learning. This has led to many educational researchers researching and writing on topics about online learning in the era of technological progress. Therefore, researchers will conduct a bibliometric analysis of online learning in the era of technological progress to find out how online learning is implemented in the era of technological progress. The research method is a literature review using bibliometric analysis. The first step in this research is determining keywords. Then proceed with an initial search based on the specified keywords. After that, the data obtained was filtered and collected based on the group. After filtering the data, initial statistical data was compiled. Then, the data that has been compiled is analyzed to obtain results. After getting the results, visualization is carried out using VosViewer to get an overview of the data that has been obtained. The results of this research show that online learning is divided into 3 clusters, namely the first cluster is online learning and education, the second cluster is Covid, and the third cluster is online learning and the Covid pandemic period. It can be concluded that online learning is a form of distance learning or training that utilizes technology as a telecommunication tool such as the internet and other devices. It has been widely implemented since the onset of the Covid-19 pandemic in Indonesia. The implementation of online learning has gone well, but there are still many shortcomings.

## A. Introduction

Education is an activity that provides learning experiences so that it can increase students' knowledge which is expected to make students have the skills to face problems (Pristiwanti et al., 2022). Education can also be interpreted as a learning experience process that is planned and organized systematically to develop individual potential and abilities. Education has an important role in life.

Education is also a process of improving attitudes and behavior by providing training and teaching about something (Hidayat & Andira, 2019). One of the goals of education is to develop an understanding of technology and digital skills to compete in society and prepare oneself to face the challenges of the times. Technological advances are fully utilized in almost all aspects of human life. In this era, almost all business models experienced major changes, from upstream to downstream.

Advances in information technology have also had a positive impact on the world of education, such as the many innovations that have been made, such as learning models (Asyrofi & Junaedi, 2016). With advances in information and communication technology, learning activities have also become better. Learning is a

change that occurs individually, or a person's change for the better (Ramdhani, 2020). In the era of technological advances, there are many types of learning carried out, one of which is online learning.

Online learning in Indonesia began to be widely implemented in 2020, when the pandemic began to enter Indonesia. The transition to online teaching and learning activities provides many adjustments that must be made by teachers and students. Where online learning requires the support of mobile devices such as smart phones, tablets or laptops to be used to access information from a flexible location (Firman & Rahayu, 2020). Online learning provides many benefits for the world of education, one of which is supporting the implementation of distance learning and the application of various technologies in learning activities. However, in its implementation, online learning also has various challenges and obstacles. One of the most common problems is internet service disruption. This difficulty often occurs in rural areas, where in these rural areas students find it difficult to take part in online learning because not all places get an internet signal (Firman & Rahayu, 2020).

To overcome this problem, there are various alternatives that can be used, one of which is implementing hybrid learning. Hybrid learning is learning that combines online learning with face-to-face learning in class (Makhin, 2021). By combining this learning, it can be a solution to overcome internet network problems in online learning.

Research on online learning has been conducted before. This research aims to determine the activeness of the online learning process during the pandemic. This research obtained results, namely that online learning must continue to be carried out to improve online learning, but it is necessary to prepare the facilities and infrastructure needed to support online learning during the pandemic (Dwi C et al., 2020). The novelty of this research is compared to previous research, namely this research analyzes online learning in the era of technological progress, not only during a pandemic, but the online learning that is seen is online learning that has been implemented to date.

For this reason, research will be carried out with the title Bibliometric Analysis of Online Learning Implementation in the Era of Technological Progress. Where this research aims to analyze the implementation of online learning in the era of technological progress. With this research, it is hoped that we will be able to find out what obstacles still occur in implementing online learning in the era of technological progress.

## B. Research Methods

This research is research using bibliometric analysis methods. Bibliometric analysis is part of the research evaluation methodology, and from which a wide range of literature has been produced. Bibliometric analysis is also a collection of mathematical and statistical methods on books, articles and forms of publication (Effendy et al., 2021). Research with bibliometric analysis is used to study articles taken from Harzing's published or published database (Ajinegara & Soebagyo, 2022). Apart from using Publish Or Prish, this research also uses VosViewer to visualize the data obtained. VosViewer is an application used to create and display bibliometric records that enable visualization using technology with text addition (Haddar, 2023; Marpaung et al., 2023; Rofika et al., 2023). There are five steps in bibliometric analysis. The steps are as follows:

1. Determining keywords for a literature search conducted in December 2023 with the keyword "online learning" using Harzing's Publish or Perish in data collection.
2. Do an initial search  
The initial search started from year 0 to 0 with a limit of 500 and obtained results from 2017-2023 of 203 articles.

**Table 1.** Data Metric Results

Metric Data	: Search result
Publication Year	: 2017-2023
Citation Year	: 14(2009-2023)
Papers	: 500
Citations	: 78063
Cites/Years	: 5575.93
Cites/Papers	: 156.13
Cites/Author	: 64700.60
Papers/author	: 300.14

Authors/paper	: 2.17
h-index	: 82
g-index	: 275
hI, norm	: 63
g-index	: 275
hI, annual	: 4.50
hA-index	: 51

### 3. Perform data filtering

Refinement of these results was carried out by filtering the articles obtained (Rahim et al., 2017). This data filtering aims to select articles that can be used as material for collecting data. Articles that do not have Google Scholar access will be excluded because they are unreachable data sources.

### 4. Compile initial data statistics

Preparation of initial data statistics is carried out by downloading and saving the initial data that has been obtained, then analyzed to obtain groups of articles based on publisher and year of publication (Rahim et al., 2017).

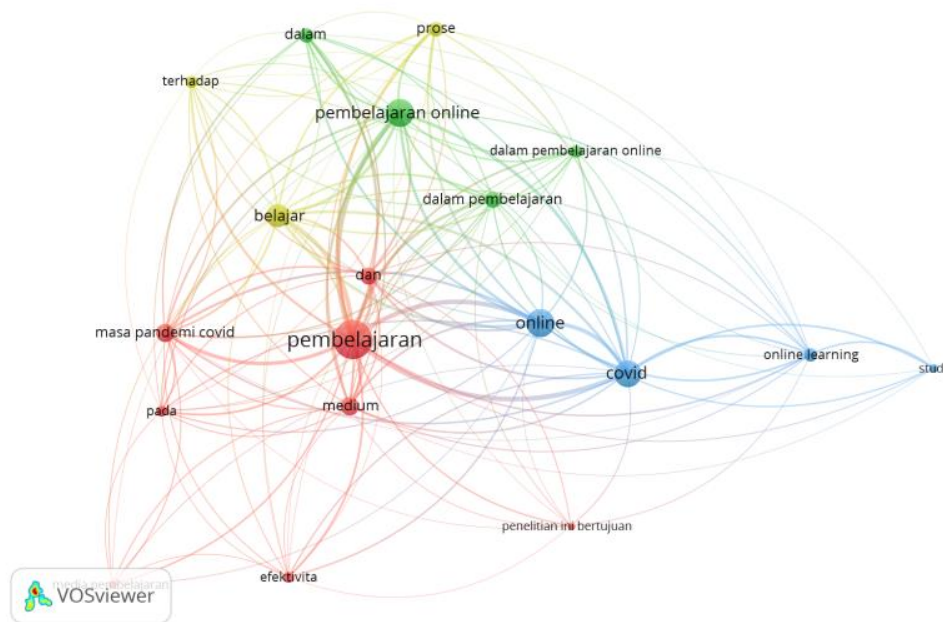
From Publish or Perish, 203 articles were obtained from 2017-2023.

### 5. Analyze data

The data in this study is presented with bibliometric analysis for the keyword "online learning" obtained from Google Scholar. Bibliometric analysis was carried out in December 2023. By screening 203 journals, 150 journals were obtained.

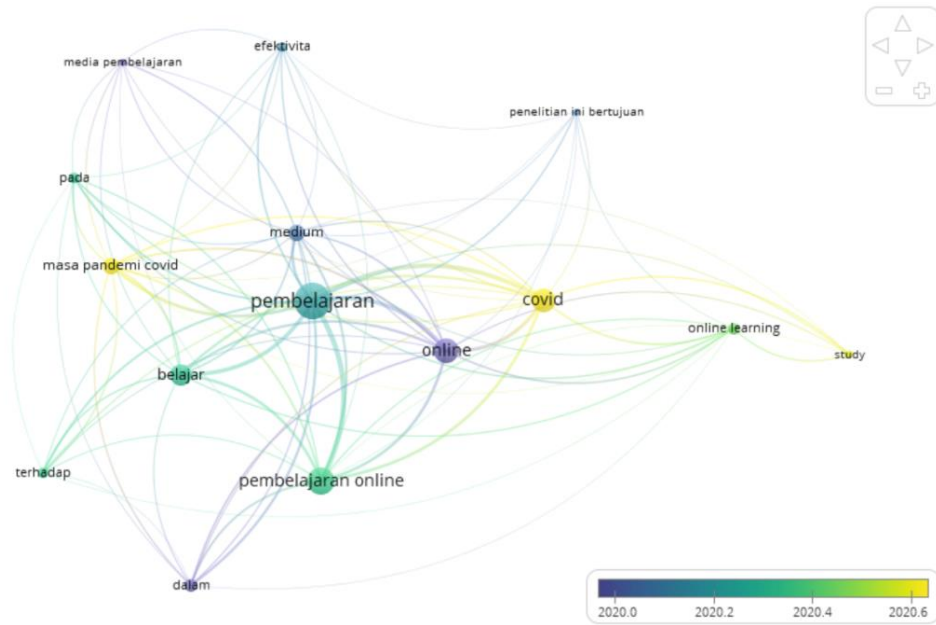
## C. Results and Discussion

To analyze the results of publish or publish, VOSviewer software is used to view several keywords. VOSviewer is used to draw bibliometric maps. The image of the bibliometric map obtained is as follows:



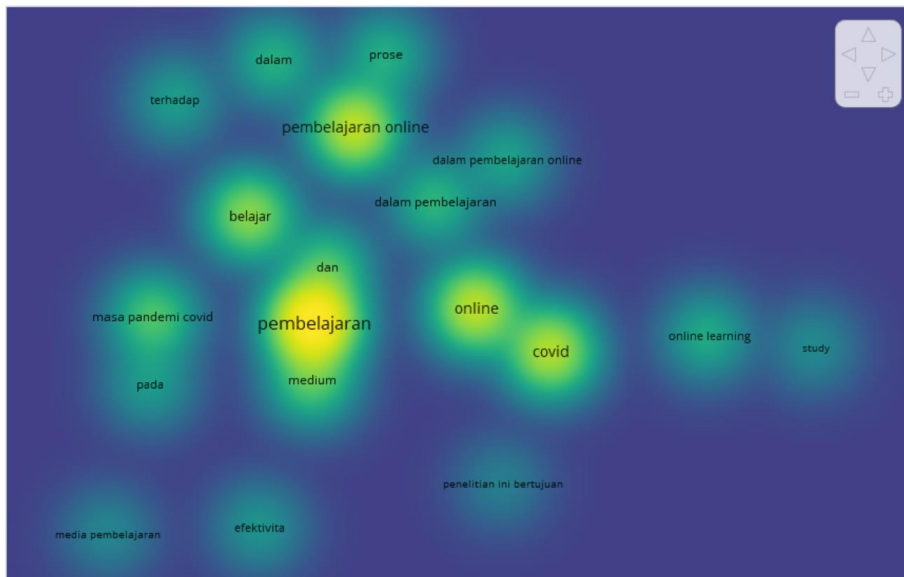
**Figure 1.** VosViewer Network Visualization

From the picture above it can be seen that the center of online learning research is learning. In the Publish or Perish application, calculations are carried out to produce 15 keywords. After obtaining these keywords, then the existing general words were removed, such as in, process, towards, study, learn, so that 3 clusters were obtained. The first cluster is online learning and learning. The second cluster is covid. And the third cluster is online learning and the Covid pandemic.



**Figure 2.** VosViewer Visualization Overlay

Figure 2 shows the visualization overlay from Vosviewer of the most published covid variables in 2020 which are very close to online learning.



**Figure 3.** VosViewer Density Visualization

Online learning is a form of distance learning or training that utilizes technology as a telecommunications tool such as the internet and other devices (Arizona et al., 2020). Online learning is also a learning process that relies on an internet connection to carry out learning activities (Adijaya & Santosa, 2018). Online learning in Indonesia has started to be widely implemented since the Covid-19 pandemic entered Indonesia. With online learning, students can communicate with teachers anytime and anywhere without time limitations. This is because of technological advances that allow students to study online. With online learning, students' learning motivation can also be increased by using flexible learning methods. In online learning, it is also necessary to choose technology-based media so that it can have a positive impact on learning (Nurmala et al., 2021). This is very important in supporting online learning. Without good media selection, online learning will not run well.

#### D. Conclusion

This research was carried out using a literature study method with 15 articles related to online learning in the era of technological progress. Technological developments have had an impact on the world of education, one of which is the ability to carry out online learning. The implementation of online learning has gone well, but there are still many shortcomings in its implementation. To overcome internet network problems in online learning, it can be overcome by using mixed learning or hybrid learning

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